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PERFORMANCE REPORT

SURVEYS AND INVESTIGATIONS PROJECTS

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Federal Aid Project No. W-13-R-34 (1980)

STUDY NO. XXIII: Mast Yields in Missouri

Job No. 1: Annual survey of mast yields

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STATE OF MISSOURI

Project No. W-13-R-34 (1980) Study No. XXIII Job No. 1

Study No. XXIII: Mast Yields in Missouri

Job No. 1: Annual survey of mast yields

ABSTRACT

The 1979 mast survey, conducted by foresters of the Department of Conservation, represented 8,711 trees and 107 counties.

The mast crop index of 118 (fair) was down 25 points from last year on the scale of 300 points. The prairie index at 113 (fair) was down 10 points and the forest region index of 120 (fair) dropped 32 points.

The only mast groups to show gains were walnut and pecan at 139 (fair) and 203 (good), respectively. White oaks at 94 (fair) dropped 85 points, the poorest year since 1975. Black oaks at 125 (fair) were down 12 points and hickories at 117 (fair) were off 6 points.

The total nut-food supplies for wildlife are marginal, about like 1975 and 1976, with shortages common in many localities. Squirrel production is expected to be down in 1980, a reflection of the nut shortages. Only a mild winter in 1979-80 can alleviate the difficulties ahead for wildlife consumers.

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SURVEYS AND INVESTIGATIONS PROJECTS

STATE OF MISSOURI

Project No. W-13-R-34 (1980) Study No. XXIII Job No. 1

Study No. XXIII: Mast Yields in Missouri

Job No. 1: Annual survey of mast yields

Objective: This survey provides nut yield information on oaks, walnuts, hickories and pecans relative to prairie and forest regions of the state.

Procedures:

Forms for ocular evaluation of the mast yields of individual trees were distributed to forest technicians of the Department of Conservation in mid-August (Figure 1). Participants were asked to appraise mast yields on at least 50 trees for each county assigned.

Data reported by observers were treated in the following manner: The percentage of trees examined, by species in each of four categories of abundance was computed. An arbitrary value was assigned each category: heavy, 3; medium, 2; light, 1; and none to few, 0 categorical value; the sum of the products represents the production index. A maximum index of 300 points is possible. Expressed as a formula:

$(H \div T \times 3) + (M \div T \times 2) + (L \div T \times 1) = I$ where

H = Total heavy yield
M = Total medium yield
L = Total light yield
T = Total of all four categories
I = Index

Production is defined for narrative purposes by the following adjectives for the range of indices:

0-75 poor
76-150 fair
151-225 good
226-300 excellent

Findings and Analysis:

The 1979 mast survey, conducted by foresters of the Department of Conservation, represents 8,711 trees and 107 counties (Figure 2 and Table 1).

Findings and Analysis (cont'd):

There were 5 counties in the northwest region and 2 counties in the south central region of the state not surveyed. There were 1,655 fewer trees examined in 1979 than in 1978 but 15 more counties were represented.

The composite mast index of 118 was down 25 points but still within the "fair" category of yields. The prairie region mast index of 113 (fair) was off 10 points and the forest region index of 120 (fair) down 32 points. Over all it was the poorest index since 1975 and 1976 (Table 2). The last good year on the composite index was 1970.

The only mast group to show a gain was walnut at 139, up 29 points but not enough to rate better than "fair". Pecan too, at 203 (good) jumped 51 points over 1978 but it was a small sample, only 111 trees all in the prairie region. The white oaks fell 85 points on the scale to 94 (fair), the black oaks were down 12 points at 125 (fair) and the hickories were off 6 points at 117 (fair). It was the poorest year for white oaks since 1975 (Table 3).

The prairie region showed gains in nuts eaten by people. Walnuts at 125 (fair) were up 31 points, pecans at 203 (good) were up 52 points and hickories at 111 (fair) climbed 26 points over last year.

The white oaks at 102 (fair) fell 60 points out of "good" category and the black oaks at 104 (fair) were down 25 points. It was the poorest score for black oaks in the past decade and the best for hickories since 1975 (Table 4).

The forest region had gains in walnuts and hickories. Walnuts were up 25 points on the scale at 149 (fair), just a point below "good" and hickories were up 6 points at 120 (fair). The white oaks fell 95 points to 90 (fair), the lowest rating since 1975. The black oaks slipped 7 points to 133 (fair). The forest region was generally more productive of most than the prairie except for the white oaks (Table 5).

The nut-food supplies for wildlife are marginal, primarily because of the sharp decline in yields by the white oak group. Squirrel production is expected to decline in 1980 as a result of the lower mast yield. Shortages of nut foods are likely in many localities before the winter of 1979-80 is over. Only a mild winter can alleviate the difficulties ahead for nut-eating wildlife

Recommendations:

In the absence of a more exact system of evaluating mast crops, the present annual survey should be continued until it can be proof tested against actual yields of individual trees. This analysis is forthcoming under Job 2 of this project.

Data and Reports:

Original data and related reports in this investigation are on file in the Federal Aid Office of the Missouri Department of Conservation, Columbia, Missouri 65201.

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Date: November 6, 1979

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FIGURE 1. MAST SURVEY RECORD

Observer_____ Date:_____ County:_____

RELATIVE ABUNDANCE MAST

Heavy - Nuts in clusters evenly distributed. Entire tree bearing nuts.
Medium - Some clusters with scattering of single nuts evenly distributed over the entire tree or clusters of nuts only on half of the crown.
Light - Scattering of single fruits over entire tree or a few clusters in ¼ of the crown.
Few to None - Less than two dozen nuts on entire tree.

MAST PRODUCING TREES (Use tally marks: 𝍸)	RELATIVE ABUNDANCE				
	Heavy	Medium	Light	Few to None	
Black Walnut (Juglans nigra)					
Butternut (Juglans cinerea)					
Pecan (Carya pecan)					
Scaly or Shagbark Hickories (Shellbark, Carya laciniosa; Shagbark, C. ovata)					
Smooth Bark & others (Bitternut, Carya cordiformis; Pignut, C. glabra; Red, C. ovalis; Black, C. texana; Mockernut, C. tomentosa)					
Bur Oak (Quercus macrocarpa)					
Chinquapin Oak (Chinkapin, Quercus muhlenbergii; Dwarf Chinkapin, Q. prinoides)					
Post Oak (Quercus stellata)					
Swamp White Oak (Quercus bicolor)					
White Oak (White, Quercus alba)					
All Other White Oaks (Overcup, Quercus lyrata; Swamp Chestnut, Q. prinus: etc.)					
Black Oak (Quercus velutina)					
Blackjack Oak (Quercus marilandica)					
Northern Red Oak (Quercus borealis)					
Pin Oak (Quercus palustris)					
Scarlet Oak (Quercus coccinea)					
Shingle & Willow Oaks (Quercus imbricaria; Q. phellos)					
Others of Red Oak group (Shumard, Q. shumardii; Southern Red or Turkey Foot, Q. falcata)					

Remarks:

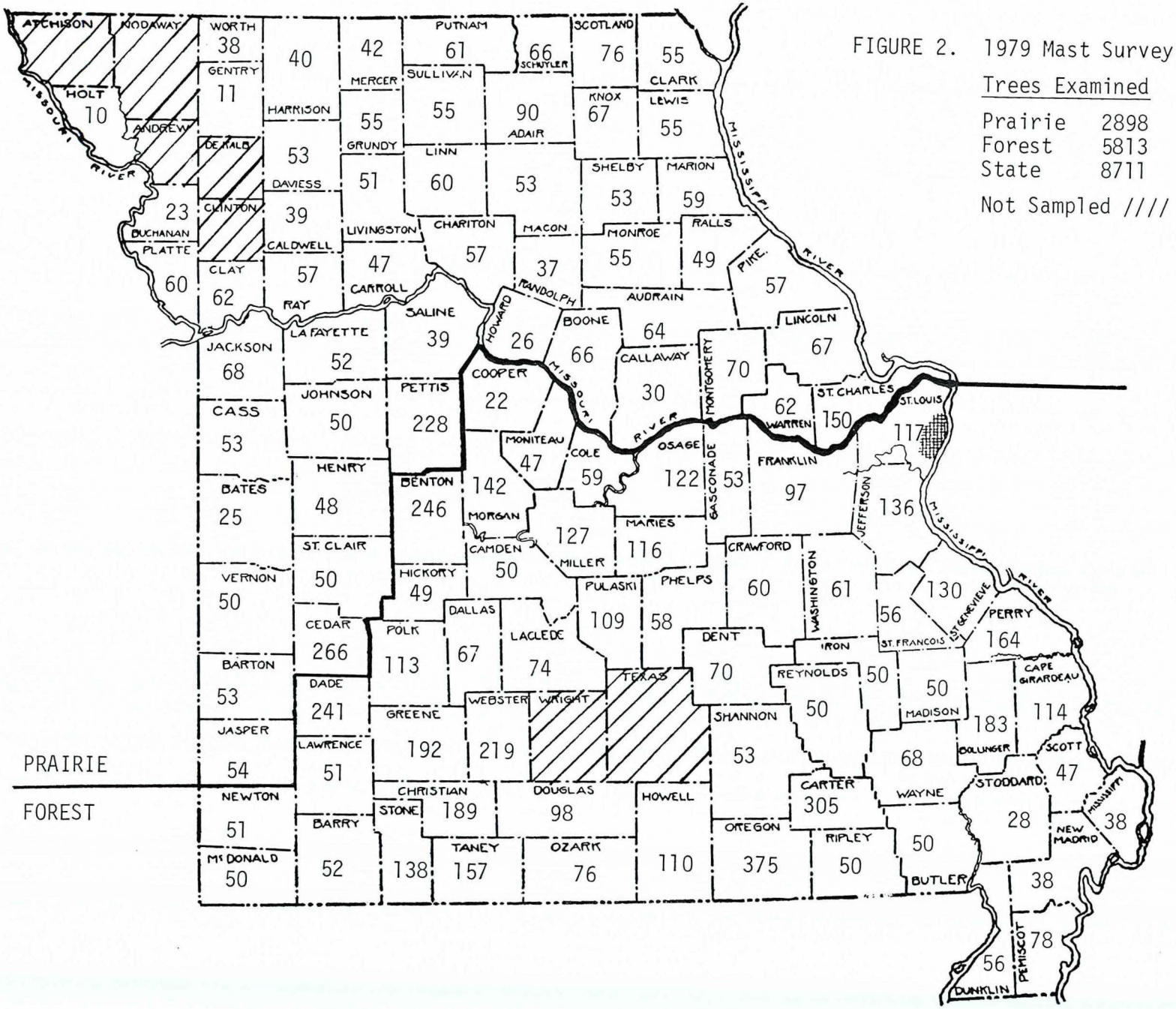

FIGURE 2. 1979 Mast Survey

Trees Examined

Prairie	2898
Forest	5813
State	8711

Not Sampled ////

TABLE 1. Evaluation of 1979 Mast Abundance by Species and Region

TREES INSPECTED			RELATIVE ABUNDANCE							
Species and Region	Number Of Trees	% Of Trees	HEAVY		MEDIUM		LIGHT		FEW-NONE	
			No.	%	No.	%	No.	%	No.	%
Walnut	1591	18.2	326	20.5	432	27.2	374	23.5	459	28.8
Pecan	111	1.3	52	46.9	28	25.2	13	11.7	18	16.2
Hickories	1663	19.1	240	14.4	386	23.2	456	27.4	581	35.0
White Oaks	2649	30.4	251	9.5	494	18.6	745	28.1	1159	43.8
Black Oaks	2697	31.0	431	16.0	641	23.8	801	29.7	824	30.5
PRAIRIE	2898	33.3	474	16.4	581	20.0	700	24.2	1143	39.4
FOREST	5813	66.7	826	14.2	1400	24.1	1689	29.0	1898	32.7
STATE	8711	100.0	1300	14.9	1981	22.8	2389	27.4	3041	34.9

TABLE 2. Composite* Fall Mast Crop Indices, By Year

Year	Prairie	Forest	State
1954	119 Fair	103 Fair	108 Fair
1955	80 Fair	96 Fair	95 Fair
1956	135 Fair	136 Fair	135 Fair
1957	114 Fair	109 Fair	110 Fair
1958	89 Fair	128 Fair	115 Fair
1959	157 Good	103 Fair	116 Fair
1960	140 Fair	124 Fair	129 Fair
1961	93 Fair	130 Fair	121 Fair
1962	150 Fair	137 Fair	141 Fair
1963	118 Fair	95 Fair	100 Fair
1964	205 Good	163 Good	170 Good
1965	139 Fair	143 Fair	142 Fair
1966	157 Good	134 Fair	139 Fair
1967	93 Fair	152 Good	138 Fair
1968	175 Good	133 Fair	143 Fair
1969	113 Fair	131 Fair	127 Fair
1970	180 Good	151 Good	158 Good
1971	120 Fair	137 Fair	133 Fair
1972	157 Good	123 Fair	132 Fair
1973	99 Fair	106 Fair	105 Fair
1974	150 Fair	135 Fair	138 Fair
1975	134 Fair	113 Fair	117 Fair
1976	101 Fair	118 Fair	115 Fair
1977	105 Fair	148 Fair	140 Fair
1978	123 Fair	152 Good	143 Fair
1979	113 Fair	120 Fair	118 Fair

*Includes acorns, hickory-nuts, pecans, walnuts, and butternuts, only. INDEX RANGE 0-300.

TABLE 3. Annual Mast Crop Indices - State

Species Group	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Walnut & Butternut	149	115	130	146	129	144	101	172	110	139
Pecan*	150	165	191	118	114	130	113	161	152	203
Hickories	108	68	120	138	99	128	80	126	123	117
White Oak Group	167	130	111	63	201	90	125	118	179	94
Black Oak Group	177	174	153	97	94	117	130	148	137	125

*Small samples

Index Range 0-300

TABLE 4. Annual Mast Crop Indices - Prairie

Species Group	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Walnut & Butternut	164	97	142	125	132	126	77	145	94	125
Pecan*	120	191	208	163	130	172	121	173	151	203
Hickories	150	69	134	124	119	158	41	85	85	111
White Oak Group	204	105	133	26	197	105	117	52	162	102
Black Oak Group	192	176	197	117	135	131	141	118	129	104

*Small samples

Index Range 0-300

TABLE 5. Annual Mast Crop Indices - Forest

Species Group	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Walnut & Butternut	141	124	124	152	128	158	110	182	124	149
Pecan*	179	130	143	100	108	100	109	150	156	--
Hickories	96	68	116	142	94	118	87	136	114	120
White Oak Group	155	137	104	70	202	88	127	132	185	90
Black Oak Group	174	173	132	94	87	113	128	153	140	133

*Small sample

Index Range 0-300